

# A New *Choreutis* from the San Francisco Bay Area, California

(Lepidoptera: Glyphipterygidae)<sup>1</sup>

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Current revisionary work in the Glyphipterygidae<sup>3</sup>, of the Palearctic fauna by A. Diakonoff (Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands), of the Japanese fauna by Y. Arita (Meijo University, Nagoya, Japan), and of the Nearctic fauna by myself, has uncovered numerous taxonomic and nomenclatural problems at the species and generic level. Brock (1967) has indicated that the family may be polyphyletic, which may require the elevation of the two included subfamilies (Choreutinae and Glyphipteryginae) to family rank, but this requires further investigation in a world-wide generic revision.

The Holarctic genus *Choreutis* Hübner is heterogeneous as presently constituted in North America, necessitating some transfers to the long unused but distinct *Tebenna* Billberg. Various characters common to several western North American species currently in *Choreutis*, including the new species described below, also indicate that this species group may require a new genus. Species of *Choreutis* and *Tebenna* have been almost exclusively placed in the former genus or in *Simaethis* Leach. *Simaethis* is a junior synonym of *Anthophila* Haworth.

The new species described below, tentatively placed in *Choreutis*, was among material sent on loan from the California Insect Survey of the University of California, Berkeley. Biological studies by J. A. Powell (University of California, Berkeley) warrant a description of the species at this time. The specific name of the new species is derived from Greek translated as "from hound's tongue."

## ***Choreutis apocynoglossa*, new species**

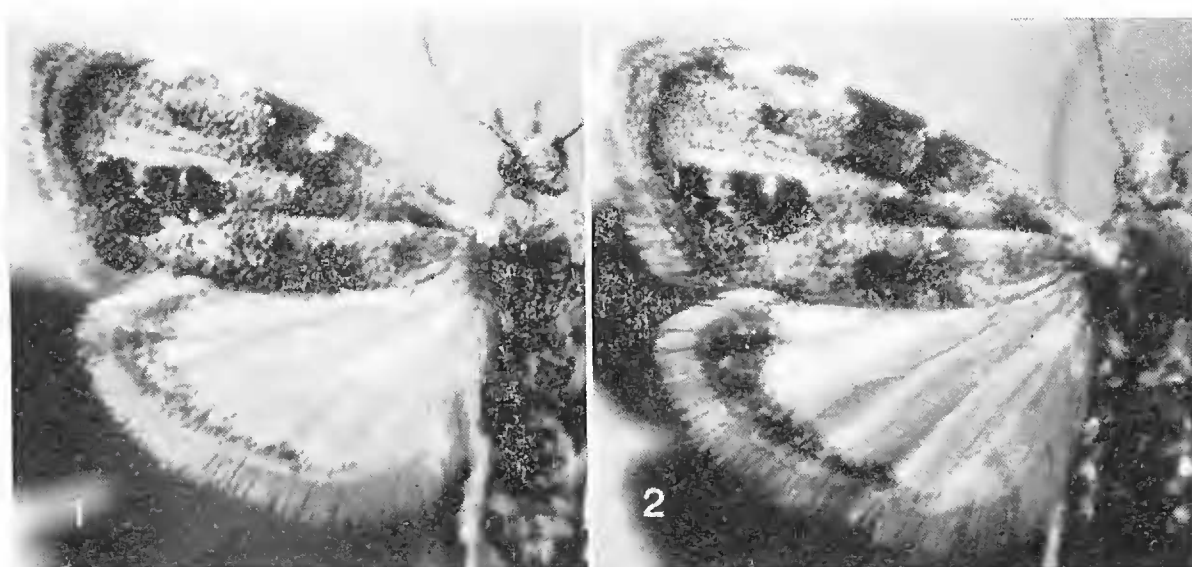
*Male* (Fig. 1).—Forewing length 4.8 to 6.0 mm. *Head*: vertex with dense white-tipped, fuscous scales directed antero-mesad; frons similar in color. Labial palpus somewhat upturned, extended anteriorly nearly twice eye diameter; basal segment

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<sup>3</sup> The International Commission on Zoological Nomenclature is considering a proposal by A. Diakonoff and myself for plenary power retention of the name Glyphipterygidae, rather than the spelling correction to Glyphipterigidae, and curtailment of the further use of *Glyphipteryx* Curtis for *Chrysoclista* in Blastodacnidae (case Z. N. (S.) 2115).



FIGS. 1-2. adults of *Choreutis apocynoglossa* Heppner: Fig. 1. holotype male; Fig. 2. allotype female.

white, tufted ventrally; 2nd segment subequal to 1st, fuscous with apical two scale rows white-tipped, tufted ventrally with fuscous and white scales as long as 2nd segment; apical segment half length of 2nd, white and fuscous. Antenna somewhat more than half forewing length; scape fuscous, remaining segments with alternating bands of dark fuscous and white; ventrally with setae (male sex character) twice length of antennal width. *Thorax*: dorsum white and fuscous intermixed. Patagia white ringed, fuscous centrally. Venter white. Legs white with some fuscous on fore- and midtibiae; tarsal segments basally fuscous, apically white. Spurs white, inner spurs near twice outer spur lengths. *Forewing*: length 2.5 greatest width; apex and tornus rounded; termen only slightly convex, oblique to tornus; costal margin and posterior margin convex; chorda weakly separated from cell; pterostigma well developed. Ground color dark fuscous, scales white-tipped. Basal fourth fuscous, some white-tipped scales, with a small patch of ochreous-tipped scales near base of radius. Antemedial fascia convex, distinctly dull white, scales basally dark fuscous. Wide median fuscous band; white spot on costal margin, followed diagonally toward tornus by silvered line ending at cubital border of cell, then interrupted before continuing to posterior margin, angled toward anal angle; upper silvered line surrounded by ochreous-tipped scales; two diffuse patches of black-fuscous scales near median on radius and anal vein. Post-medially of ground color; distal third with four diffuse, white longitudinal striae above black tornal mark (striae sometimes more or less merged); costal margin with white spot just beyond median and another at apical fourth of wing; metallic-silver scales on radius at median and near apical corner of cell; apical angle with fuscous curved line followed by metallic-silver curved line; distal linear yellow spot at apex. Tornal quarter with large black trapezoidal spot, interrupted distally beyond midpoint by vertical light yellow line, with metallic-silver spot in anterior half; a distal border of metallic-silver. Tornal angle fuscous, scales white-tipped, some yellow-tipped scales adjacent to metallic-silver border of large black spot. Fringe with basal row of fuscous, white-tipped scales, then fuscous to diffuse white outer margin of termen; longer and oblique at tornus. All metallic-silver spots elevated above wing surface due to convex scales. Ventrums with costal white

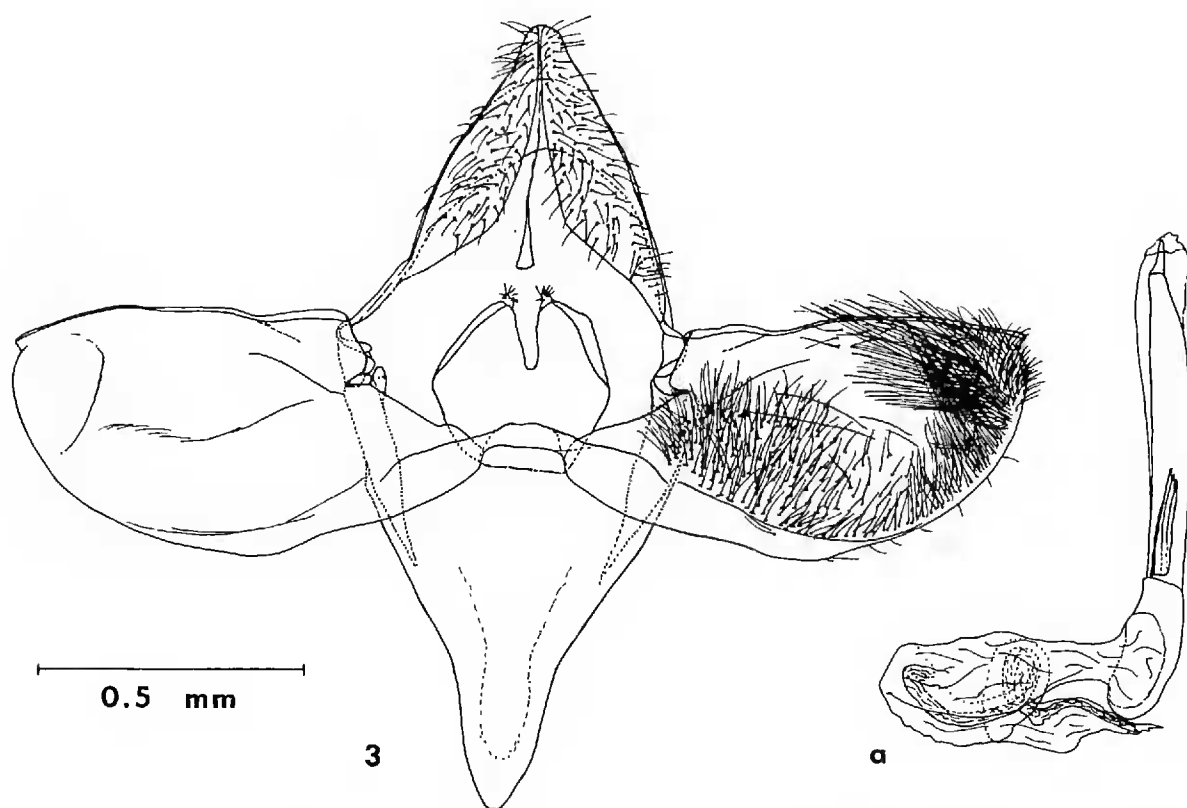


FIG. 3. male genitalia of *Choreutis apocynoglossa* Heppner holotype, ventral aspect; a, ventro-lateral aspect of aedeagus.

spots repeated; costal half of wing evenly fuscous; posterior half lustrous dull white to irregular border area with costal half; apex fuscous, extended as a fuscous terminal border to tornus. *Hindwing*: triangular, tornal margin broadly rounded; costal margin convex; ground color uniformly lustrous white except for some scattered fuscous scales at base (rarely in central white area); fuscous margin at termen; margin broader at apical angle, becoming narrow toward tornus. Fringe white, slightly brown and basally fuscous only at apical margin. Ventrums white; some fuscous at apical angle. *Abdomen*: fuscous and white ringed dorsally and ventrally, more white laterally, each segment anteriorly fuscous and posteriorly white. *Genitalia*: as in Fig. 3. Tegumen convex posteriorly, becoming a narrow band laterally. Socii large, well developed. Gnathos absent except for apparently vestigial and plate between socii. Juxta basally elongated to juncture with valval sacculus; lateral edges becoming thin. Valva dorso-laterally convex. Vinculum broadly convex. Aedeagus with 3-4 strongly sclerotized, flat, sharply pointed cornuti almost as long as phallobase length. Genitalia drawn from holotype (JBH prep. No. 255); 9 preparations examined.

*Female* (Fig. 2).—Forewing length 5.8 to 6.5 mm. As described for male, but with antenna lacking ventral setae; hindwing terminal fuscous border sometimes wider than in male; ventrum of forewing with less fuscous on termen than in male. *Genitalia* (Fig. 4): ovipositor lobes small, sharply edged, with many setae on sclerite anterior to lobes. Posterior apophyses longer than anterior apophyses; basally broad and flattened. Anterior apophyses with a broad flattened central area with a slight hook-projection ventro-laterally. Ostium round with broadened antero-ventral margin, bordered anteriorly by extensive setal field. Ductus bursae sclerotized, nearly as wide as ostium, becoming two times wider at enlarged, dis-



tinct offset juncture with bursal ventrum. Junction of ductus bursae and ductus seminalis at one-third ductus bursae length from ostium; ductus seminalis with oval bulla seminalis. Bursa copulatrix large, heart-shaped, with somewhat elongate-pointed anterior end. Signum a linear band of spicules merging to smaller spicules laterally, as a line between heart-shaped lobes, from ductus bursae junction to two-thirds distance to anterior end dorsally. Bursa with minute spicules over most of surface. Dorsal margin of ductus bursae-bursa juncture with patch of large spicules. Genitalia drawn from allotype (JBH pre. No. 256); 7 preparations examined.

*Types*.—Holotype male and allotype female: PATTERSON RESERVE, DEL VALLE LAKE [ROCKY RIDGE, 8 air mi. SSE. LIVERMORE], ALAMEDA COUNTY, CALIFORNIA, 3 Feb 1974, rearing 74B1, emerged ex *Cynoglossum grande* 23 Feb 1974 (J. A. Powell). Holotype and allotype with the University of California, Berkeley, deposited on indefinite loan at the California Academy of Sciences.

*Specimens examined*.—45 paratypes from California: Marin County: Alpine Lake, 25 Apr 1958 (1 ♀); Lagunitas, 17 Mar 1970 (1 ♀) (P. A. Opler).—San Mateo County: San Bruno Mts., 20 Mar 1970 (2 ♂) (Opler).—Contra Costa County: Tilden Park, Berkeley Hills, 16 Feb 1970, rearing 70B6, emerged ex *Cynoglossum grande* 28 Feb 1970 to 7 Mar 1970 (4 ♂, 4 ♀) *Cynoglossum* association, 16 Apr to 20 Apr 1969 (6 ♂, 13 ♀, Opler) Merry Go Round Hill, Berkeley Hills, 20 Feb 1973, rearing 73B2, emerged ex *Cynoglossum grande* 10–15 Mar 1973 (3 ♂, 2 ♀); MGR Hill-Wildcat Creek, Berkeley Hills, 7 Mar 1972, rearing 72C3, emerged ex *Cynoglossum occidentale* 22–29 Mar 1972 (5 ♀). Alameda County: Patterson Reserve, Del Valle Lake, 3 Feb 1974, rearing 74B1, emerged ex *Cynoglossum grande* 23 Feb 1974 (1 ♂, 1 ♀), 24 Feb 1974 (1 ♀); 17 Feb 1973, rearing 73B1, emerged ex *Cynoglossum grande* 6 Mar 1973 (1 ♀).

Additional specimens from California not designated as paratypes: "Placer Co.", 20 Apr (4 ♂, 3 ♀—USNM) (A. H. Vachell); 1 May (1 ♂—MCZ; 1 ♀—USNM) (Vachell); Cisco, Placer Co., 1 Jun 1905 (1 ♀—USNM) (Vachell).

All specimens were collected or reared by J. A. Powell unless indicated otherwise. Paratypes are deposited in the following collections: University of California, Berkeley, Canadian National Collection, Florida State Collection of Arthropods, U. S. National Museum of Natural History, and my own collection.

Specimens from the San Francisco Bay area show little variation, except that freshly emerged specimens have darker fuscous markings than flown specimens. There is one anomalous female from the type locality with the 2nd anal vein fuscous and with a spot at the discal end of the cell. This female approaches the more extensive fuscous hindwing scaling of some of the specimens (♂ and ♀) of the Sierra Nevada foothill population (Placer County). These latter specimens include some that have white hindwings as in the coastal population, others that have most of the hindwings fuscous, while some are intermediate. The dark-hindwing members of this Placer County population greatly resemble *Choreutis occidentella* Dyar, which is most closely related to *C. apocynoglossa*, but they may be distinguished by always having at least the anal margin to the 3rd anal vein of the hindwings white. *C. occidentella*

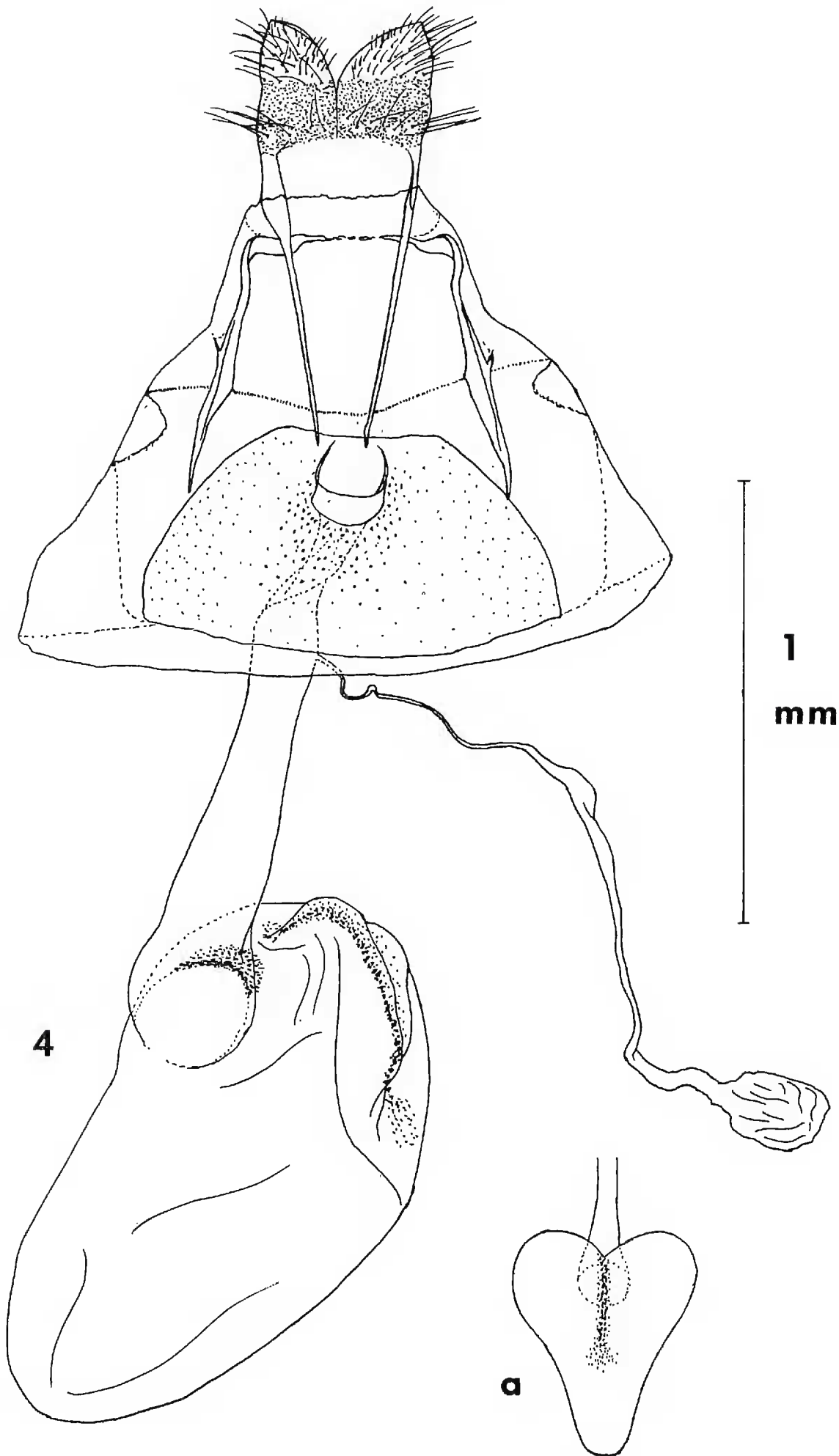


FIG. 4. female genitalia of *Choreutis apocynoglossa* Heppner allotype, ventral aspect; a, dorsal schematic of bursa copulatrix inflated (reduced scale).

has the hindwings uniformly gray-brown with no white scales. *C. occidentella* also has a consistently longer and thinner aedeagus, and a valval sacculus that is more produced at its distal end than in *C. apocynoglossa*.

*Choreutis occidentella* occurs throughout montane areas of the Rocky Mountains, from northern New Mexico to northern British Columbia, west into northern California and the Sierra Nevada. A series of melanic Colorado specimens, defined as *Choreutis coloradella* Kearfott, probably represents a high altitude form of *C. occidentella*, although a final clarification of the status of *C. coloradella* requires further investigation. The only known zone of possible contact between *C. apocynoglossa* and *C. occidentella* is in the Placer County area of the Sierra Nevada, although another likely contact zone would be in northern Lake County, which is adjacent to montane areas of Glenn County, the southern known limits of *C. occidentella* in northern coastal California. The darker hindwings of some members of the Placer County population indicates possible hybridization with *C. occidentella*. Since the exact status of the Placer County population of *C. apocynoglossa* is uncertain, the available specimens are not added to the paratype series.

*Choreutis caliginosa* Braun from Montana is superficially similar to *C. apocynoglossa* but may be easily distinguished by the very different genitalia. The Mexican *Choreutis schausiella* Busck, from Las Vigas, Mexico, but erroneously stated to be from New Mexico (Busck, 1906), is likewise similar to *C. apocynoglossa*, but the genitalia are very different and the adults are about half the size of *C. apocynoglossa*.

Flight period.—Mid-March to late April (San Francisco Bay area); late April to early June (Sierra Nevada foothills).

Biology.—Hosts: *Cynoglossum grande* Douglas and *Cynoglossum occidentale* A. Gray (Boraginaceae). The only other *Choreutis* known to have a host plant in the Boraginaceae is *Choreutis augustella* Clarke of the Pacific Northwest (Braun, 1940). Most other *Choreutis* species, where known, utilize Labiatae and Urticaceae, but the hosts remain unknown for the majority of the species. Most known *Tebenna* hosts are in Compositae. The hosts of species closely related to *C. apocynoglossa* are not known. Characteristic of *Choreutis* and related genera, *C. apocynoglossa* larvae pupate in an elliptical, flattened cocoon of silk formed in two layers. Pupal shells are extruded with adult eclosion. Immature stages will be described in my revision of the family. Collection sites in the San Francisco Bay area are typical Coast Range oak woodland habitats where *Cynoglossum* often is a common understory plant. While *Cynoglossum* occurs in open surroundings as well as

among dense oak stands, larvae of *Choreutis apocynoglossa* have thus far been found only on plants growing in deep shade (Powell, personal communication).

#### ACKNOWLEDGMENTS

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#### SCIENTIFIC NOTES

**Galápagos Moths.**—The appearance of Hayes' well-illustrated publication on the larger moths of the Galápagos Islands (Proc. Calif. Acad. Sciences, series 4, vol. 40, pp. 145-208, 1975) represents a landmark in the study of Galápagos insects. Including the colored frontispiece which illustrates three adult female and two larval color phases of the common *Manduca rustica calapagensis* Holland (long known under the familiar generic name "*Protoparce*"), there are 157 photographs of adult moths representing all but two of the species treated, usually including both sexes and frequently melanic phases and other variants, and the male genitalia (in one case the female genitalia, also) of a few of the old species and all but one of the new species described. Thus, the opportunity is provided for the non-specialist to identify most of the species by habitus, at least tentatively, while actually engaged in field studies in the archipelago. Hopefully, it will stimulate use of these moths in ecological studies, including their role in the pollination of Galápagos plants (see Linsley, 1966, in Bowman, Proc. Symposia Galápagos Intern. Sci. Project, Univ. Calif. Press, pp. 225-232). Since many of the species visit flowers in the daytime or at dusk, their activities lend themselves